A technological revolution has occurred in the last 10 years. In biology, high density arrays of biomolecules (such as cDNA and protein antibodies) have been successfully used on glass slides (chips) to screen for a number of cellular activities such as gene expression. Microcircuitry has developed to the point that massively parallel super computers are obtainable by modest sized research labs. The introduction of high-density "gene chips" and high-speed computer chips offers the first real opportunity to address some of the fundamental problems that have plagued environmental health risk assessment for the last 20 years. The combination of these two technologies will, in the near future, lead to mechanism-based evaluations of health risks that will be solidly founded in data and able to convincingly demonstrate precursor biological effects at very low doses. This will lead to less reliance on extrapolation models for estimating risks from environmental exposures. In addition, the ability to apply these methods to both human and animal tissue will lead to species extrapolations that are better founded in data demonstrating common responses.